CHAPTER 2 - FORECASTS

LAKE HAVASU CITY MUNICIPAL AIRPORT

LIMITED MASTER PLAN UPDATE

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City of Lake Havasu City

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2.1 INTRODUCTION

The objective of forecasting in the master planning process is to provide an estimate of future aviation demand levels that are expected at an airport. The process involves formulation of demand relative to fundamental aviation activities and a broader understanding of aviation and socioeconomic trends that may emerge as stronger indicators of the levels. The forecasts are used to analyze the airport's ability to support future demand levels and identify facility requirements to meet those needs.

For the purpose of the Limited Master Plan Update for LHC Municipal Airport, the objective of forecasting is to validate or adjust the 1994 Master Plan forecasts by comparative analysis with historical data of recent years. The analysis will lead into an assessment of facility requirements and possible development alternatives.

2.2 METHODOLOGY

The 1994 Master Plan used several analytical techniques for forecast development, in conjunction with judgmental processes based on trends and behavioral aspects of air travel, to derive at preferred forecasts. The approach of the comparative analysis is to gauge the 1994 Master Plan projections with actual aviation activity recorded during the initial phase of the forecasts. The process includes further evaluation between forecasts and historical data and adjustment to the forecasts as needed. The objective of the analysis is to incorporate recent data into providing estimates of future aviation activity levels expected at LHC Municipal Airport.

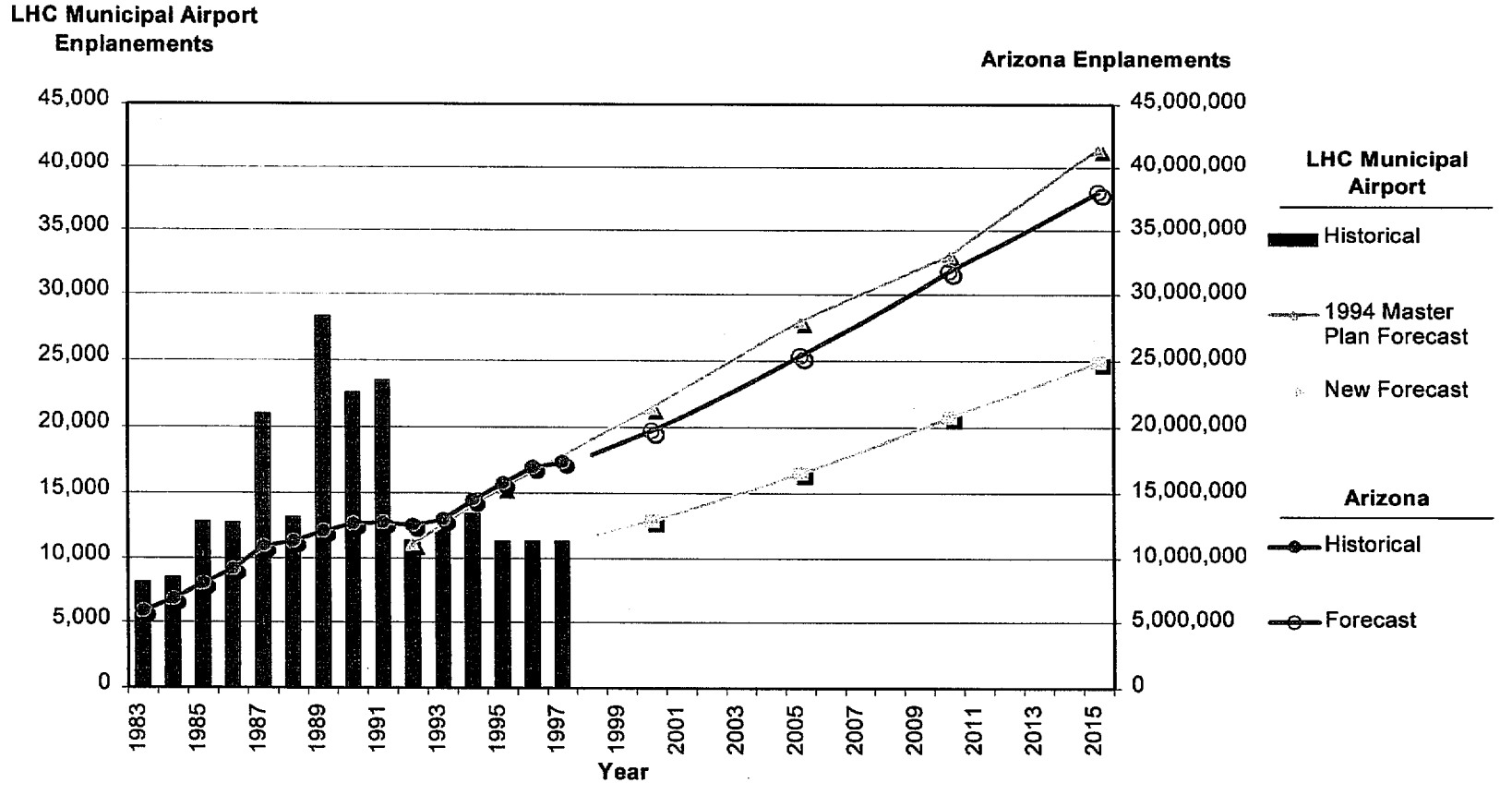
Sources assisting with the analysis include the 1998 FAA Terminal Area Forecast (TAF) System, Arizona 1995 State Aviation Needs Study (SANS), and the on-going 1998 Arizona Air Service Study. The 1998 TAF System contains in its database historical data and FAA's projections for airports in the National Plan of Integrated Airport System. It will be used as the primary source for historical data. However, it will also be referred to, along with Arizona's SANS and Air Service Study, in determining demand relative to the underlying factors that indicate the level of aviation activity.

2.3 FORECASTS

2.3.1 Enplanements

Mesa Airlines, under America West Express, continues to be the airline providing passenger service at LHC Municipal Airport. Forecast of enplanements is important in identifying the facility requirements to accommodate future airline activity needs. Historical and forecast enplanements for LHC Municipal Airport and Arizona are depicted in Figure 2-1 and Table 2-1.

Figure 2-1
Forecast Enplanements



Source: 1998 FAA Terminal Area Forecast System

Table 2-1
Forecast Enplanements

Year	LHC Historical Enplanements	1994 Master Plan Forecast	Arizona Enpl./Forecast	New Forecast
1983	8,182		5,871,415	
1984	8,497		6,808,734	
1985	12,824		8,015,531	
1986	12,721		9,123,466	
1987	21,000		10,905,233	
1988	13,169		11,275,137	
1989	28,325		12,044,740	
1990	22,583		12,630,880	
1991	23,502		12,712,038	
1992	11,395	11,138	12,514,302	
1993	12,292	12,592	12,951,587	
1994	13,430	14,046	14,440,516	
1995	11,328	15,500	15,752,818	
1996	11,347	16,700	16,974,715	
1997	11360	17,900	17,360,241	
2000		21,500	19727,558	12,909
2005		28,000	25,347,214	16,586
2010		33,000	31,765,953	20,787
2015		41,500	38,050,937	24,899

Notes: Forecasts between target years were extrapolated for comparison purposes.

Source: 1998 FAA Terminal Area Forecast System

In the initial phase of the forecast, historical enplanements for LHC Municipal Airport did not follow the forecasted trend by the 1994 Master Plan between 1992 and 1997. From 1992 to 1994, actual enplanements experienced an average growth rate of 8.6%, which was only slightly lower than the projected 13.1%. Then in 1995, enplanements fell to 11,328 from 13,430 in 1994. This drop is primarily attributed to the reduced level of air service to LHC Municipal Airport. The 1994 Master Plan forecast projected 15,500 enplanements in 1995, approximately 37% higher than actual enplanements. After 1995, enplanements at LHC Municipal Airport remained at a growth rate of less than one percent. After 1995, the 1994 Master Plan projected a 7.7% average annual growth rate.

To assess LHC Municipal Airport's enplanements historical trend, the number of enplanements recorded for the State of Arizona was reviewed. As illustrated in Figure 2-1, enplanements for LHC Municipal Airport followed a more contrasting pattern than enplanements for Arizona, which experienced a smoother gradual curve. The difference is that the volume of enplanements recorded for Arizona versus LHC Municipal Airport is such that any gain or drop of enplanements for the state appears subtle.

Nevertheless, the historical trend of enplanements for LHC Municipal Airport and Arizona were similar, the difference being only in the degree of up- and downturn experienced. For example,

in recent years when the enplanement growth rate for LHC Municipal Airport declined to less than one percent, Arizona also experienced a lower enplanement growth rate. The growth rate for Arizona in 1997 was only 2.3%, down from 7.8% in 1996 and 9.1% in 1995.

The slowdown in enplanements is not expected to continue. Studies, such as Arizona 1995 SANS and 1998 Air Service Study, indicate trends influencing aviation activity are on an upswing. Strong U.S. and World economy, higher passenger yields, stronger airline markets, and regional/commuter airlines outpacing the major airlines project enplanements will begin experiencing a sturdier growth rate. The 1998 TAF System forecasts enplanements for Arizona to grow from 19.7 million in year 2000 to 25.3 million in 2005, 31.8 million in 2010, and 38.1 million in 2015.

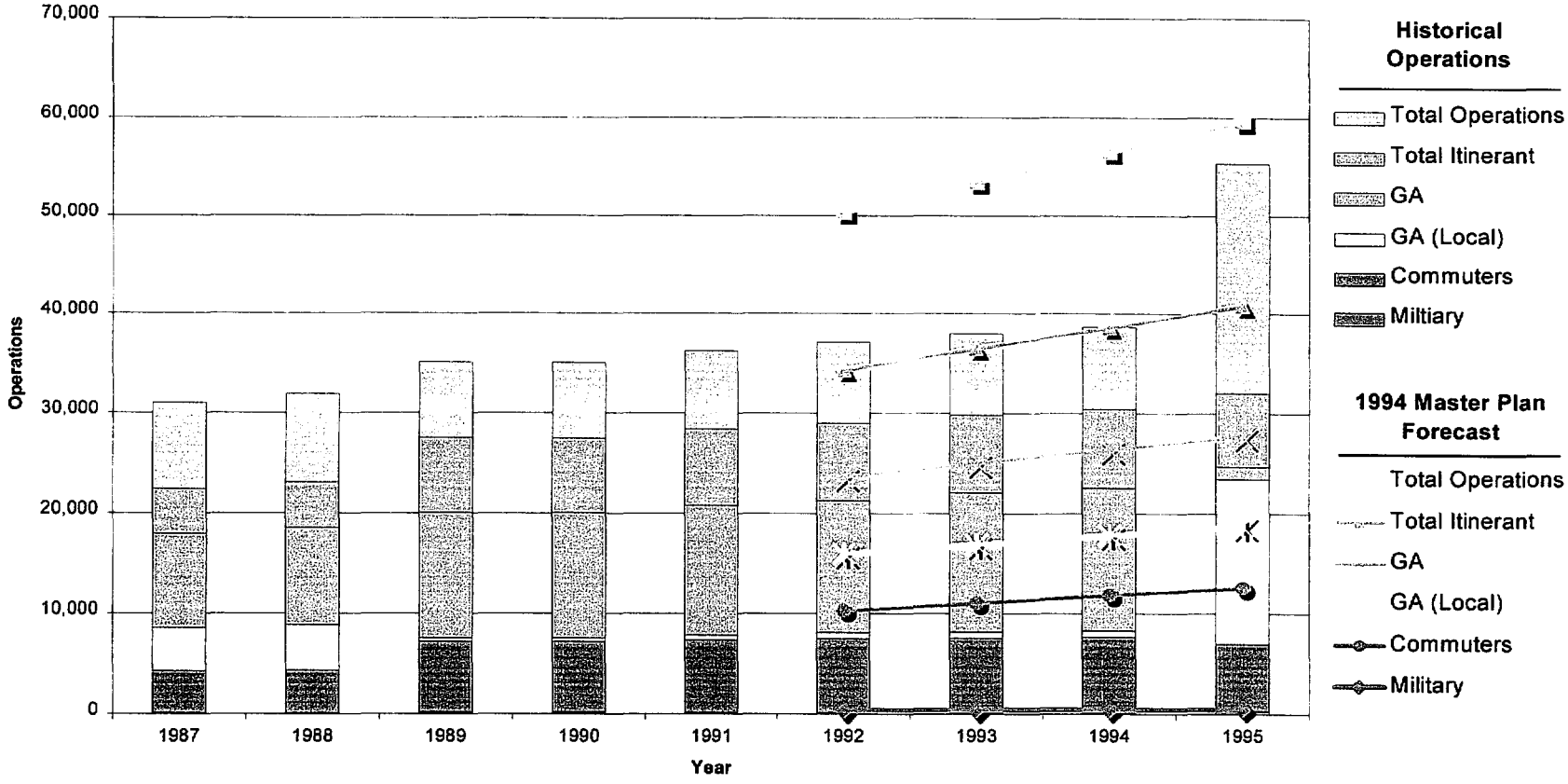
LHC Municipal Airport should keep pace with Arizona. The socioeconomic indicators for Lake Havasu City support that projection. In recent years, Lake Havasu City experienced an average annual growth rate of nearly 5% in its civilian labor force and over 5% in the number of employed (see Table 1-3, Chapter 1), while Arizona experienced a 3.7% and 3.4% average annual growth in labor force and employment, respectively. The population in Lake Havasu City also continues to increase, resulting in a stronger market. Thus, the new enplanement forecast for LHC Municipal Airport has 12,909 enplanements in year 2000, 16,586 in 2005, 20,787 in 2010, and 24,899 in 2015. This is comparable to the 1994 Master Plan projections that reflected a 5.6% average annual growth through 2015 -- this Plan projects 4.5%. The major difference is the base year.

The enplanement growth rate could even exceed the adjusted forecast if LHC Municipal Airport captured more of the market within its service area. The Arizona 1998 Air Service Study indicates the airport only realized approximately 26% of the market within its service area for 1997. The study found that the passenger base utilizing LHC Municipal Airport is made up entirely of passengers from the local community, even though its service area covers several communities within Arizona and California. Surveys conducted by the study indicate the passenger leakage is due, in large part, to the level of commercial service provided at LHC Municipal Airport. The recent flat growth in enplanements is largely attributed to commercial aviation cutting services and not the lack of a market. Thus, the survey results as well as the knowledge and experience of airport-related staff imply that improvements to commercial service could result in higher growth rates than the new forecast suggests.

2.3.2 Aircraft Operations

Forecast of aircraft operations is another element of aviation activity that is used to identify facility requirements for an airport to meet its future needs. The historical trend of aircraft

Figure 2-2
Aircraft Operations 1987-1995



Source: 1998 FAA Terminal Area Forecast System

operations for LHC Municipal Airport and the initial phase of the 1994 Master Plan forecast are illustrated in Figure 2-2 for comparison purposes. It should be noted that Airport staff indicate actual numbers of operations for 1995 were more in line with the previous years than logged in the 1998 TAF System.

Prior to 1995, LHC Municipal Airport experienced a gradual growth rate in aircraft operations. The biggest jump occurring from 1988 to 1989 when the growth rate was almost 10%. During the other periods, the growth rate ranged from approximately 2% to 3%. The 1994 Master Plan forecasted the growth rate at approximately 6% between 1992 and 1995, slightly higher than actually recorded.

In 1995, LHC Municipal Airport experienced a significant jump in number of operations. The source of the increase was local operations conducted by general aviation aircraft. The 1998 FAA TAF System recorded over 23 thousand local operations for LHC Municipal Airport in 1995. It was an increase of over 180%. The rise in local operations almost brought the total number of operations up with the 1994 Master Plan forecast for 1995 of 59,600 operations.

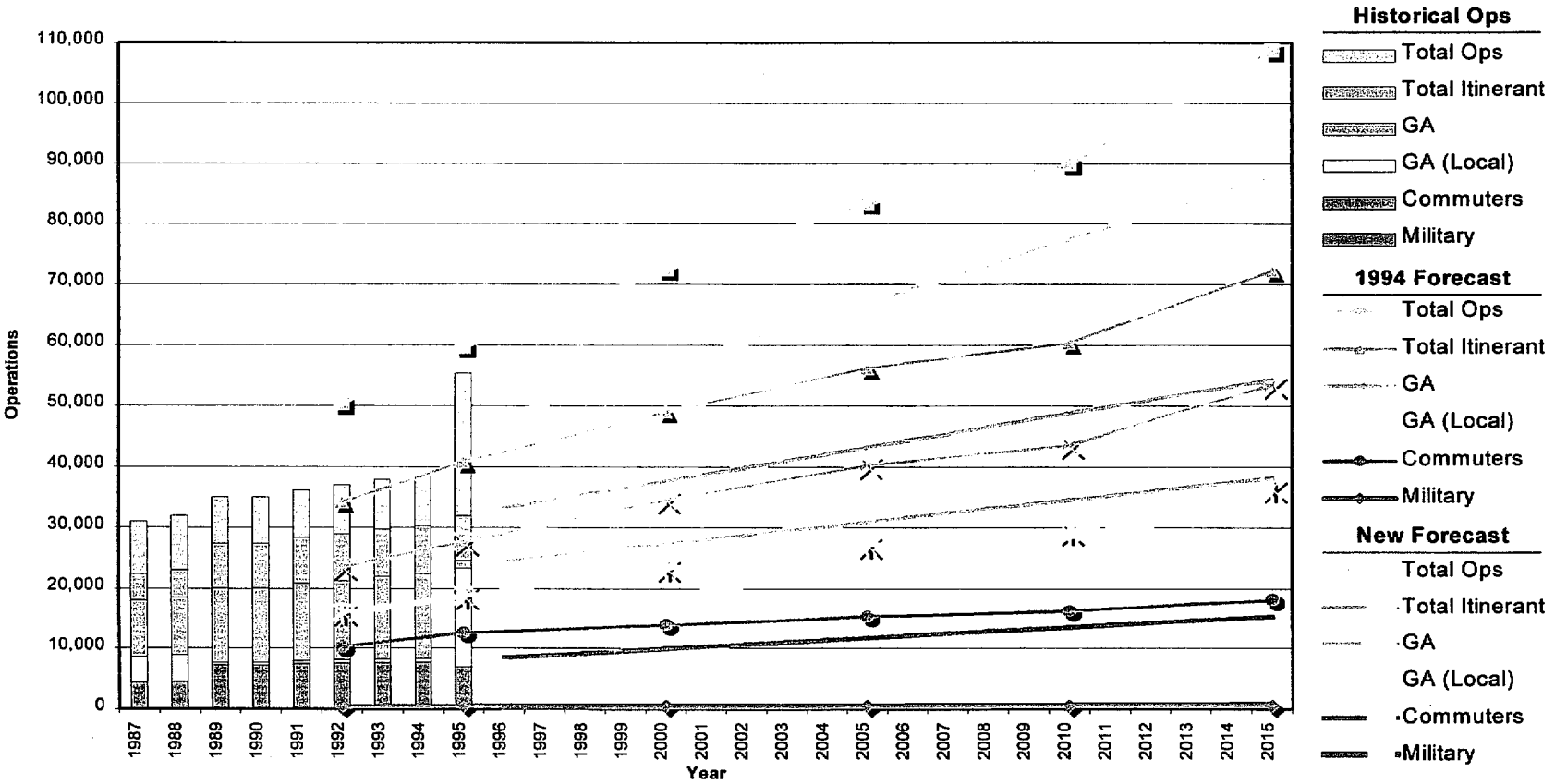
The distinction with the 1994 Master Plan forecast is that it begins its projection with over 50 thousand total operations in 1992, but the 1998 TAF System only recorded 37,089 total operations for the same year. The new forecast reflects an adjustment to the 1994 Master Plan forecast accounting for this difference in its level of operations, but maintains a similar growth rate in the low 2% to 4% range. Table 2-2 and Figure 2-3 depict forecasts of aircraft operations for the duration of the planning period.

Table 2-2
Forecast Total Aircraft Operations

Year	Historical Operations	1994 Master Plan Forecast	New Forecast
1987	31,000		
1988	31,927		
1989	35,061		
1990	35,048		
1991	36,251		
1992	37,089	50,292	
1993	37,975	53,395	
1994	38,675	56,497	
1995	55,344	59,600	
2000		72,400	56.420
2005		83,400	66,878
2010		89,800	77,335
2015		108,700	87,793

Notes: Forecasts between target years were extrapolated for comparison purposes.
Source: 1998 FAA Terminal Area Forecast System

Figure 2-3
Forecast Aircraft Operations



Source: 1998 FAA Terminal Area Forecast System

General Aviation Operations

General aviation accounted for an average of approximately 82% of the total number of operations at LHC Municipal Airport between 1987 and 1995. Its significant presence strongly influences the future planning of the airport. Therefore, the historical trend and forecast of general aviation operations were further reviewed separately and in conjunction with the Arizona 1995 SANS GA forecast. Table 2-3 and Figure 2-4 depict the forecasts of GA operations in LHC Municipal Airport.

Table 2-3
Forecast GA Operations

Year	LHC Historical GA Operations	1994 Master Plan Forecast	AZ 1995 SANS GA Forecast	New Forecast
1987	26,600			
1988	27,433			
1989	27,664			
1990	27,664			
1991	28,686			
1992	29,387	39,616		
1993	30,200	41,910		
1994	30,800	44,206		
1995	48,000	46,500	34,364	
2000		58,000	39,651	46,090
2005		67,500	43,805	54,631
2010		73,000	48,336	63,172
2015		90,000	51,735	71,713

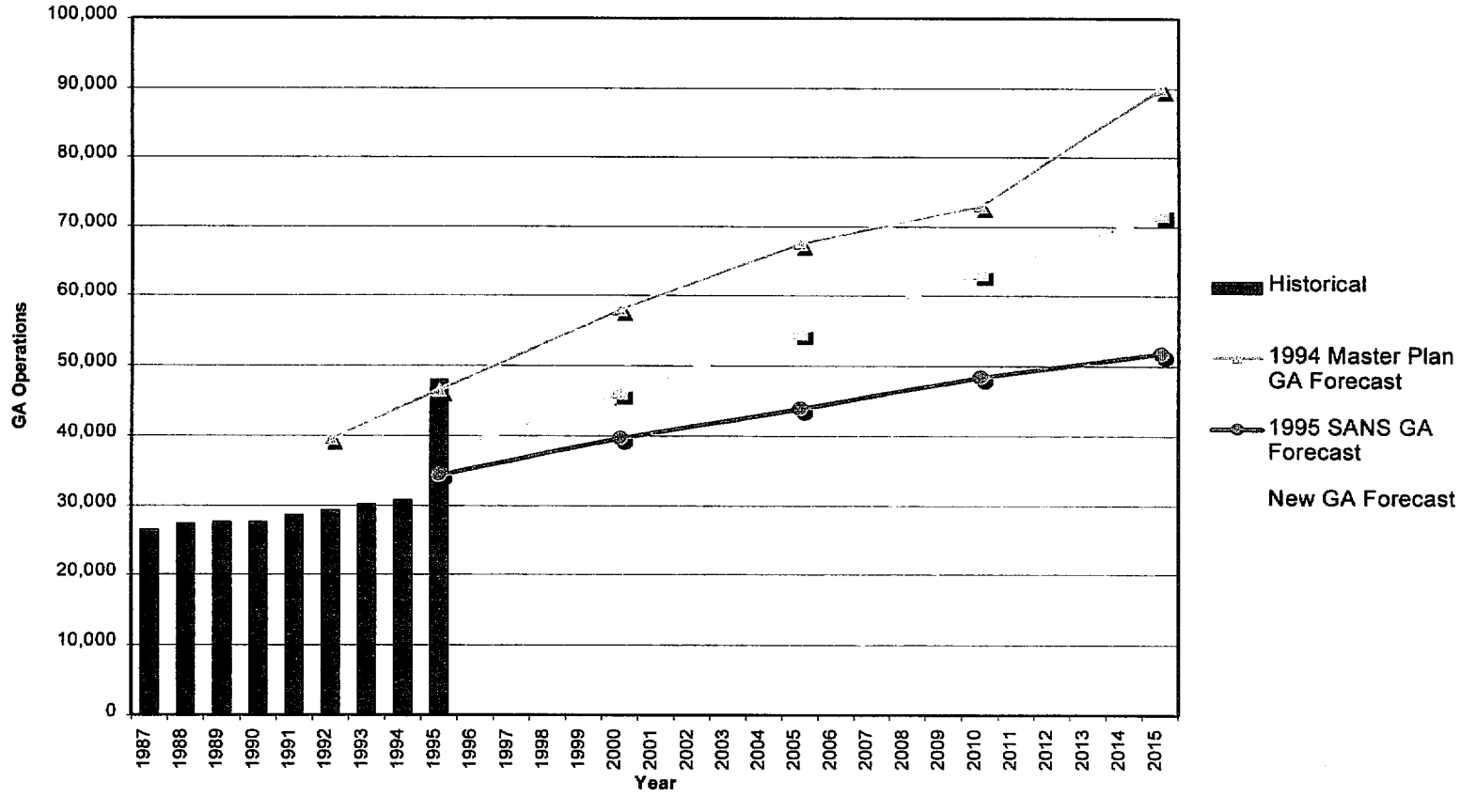
Notes: Forecasts between target years were extrapolated for comparison purposes.
The Arizona 1995 SANS GA forecast is for LHC Municipal Airport only.

Source: Arizona 1995 State Aviation Needs Study
1998 FAA Terminal Area Forecast System

Prior to 1995, GA operations in LHC Municipal Airport were experiencing a growth rate below 4%, when in 1995 operations jumped approximately 56%. The 1994 Master Plan forecast projected a growth rate of almost 6% for the initial phase of the forecast (1992-1995), and gradually declining until after the year 2010 when the rate dropped to nearly 4%. It is also important to note that the 1994 Master Plan used a higher level of operations for 1992 than the 1998 FAA TAF System recorded.

On the other hand, the Arizona 1995 SANS projected the growth rate to continue the same pattern as the historical trend prior to 1995. Its forecast reflects an annual average of just over 3% between 1995 and 2000, and gradually declining to below 2% after year 2010. However, it does not account for the increase of operations in 1995.

Figure 2-4
Forecast GA Operations



Source: Arizona 1995 State Aviation Needs Study and 1998 FAA Terminal Area Forecast System

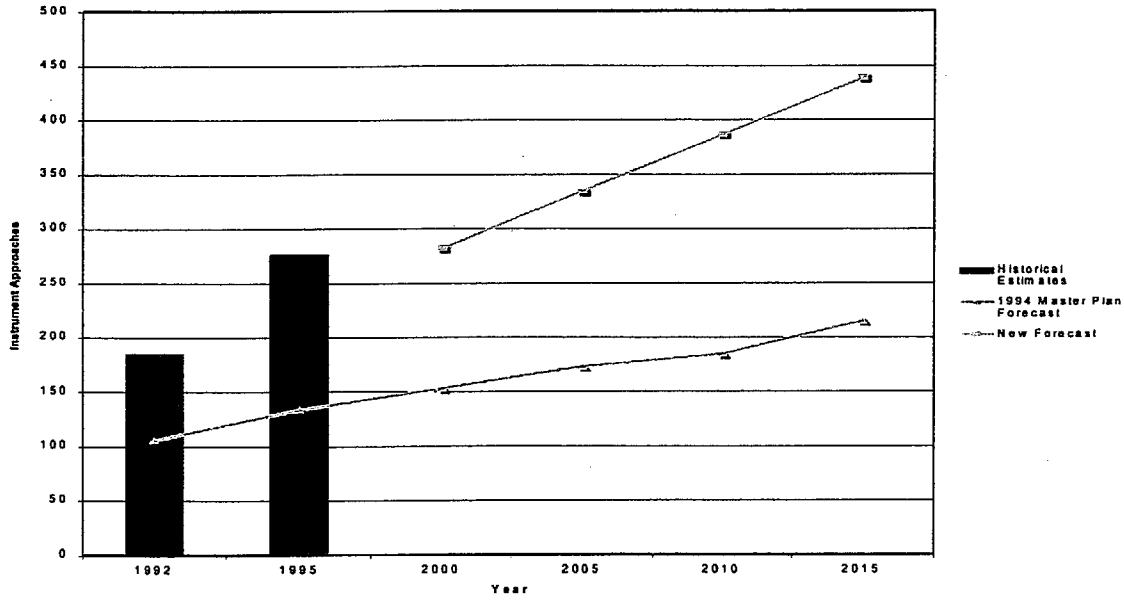
Consequently, the new forecast projects approximately 1% higher growth rate than the Arizona 1995 SANS forecast. The new forecast has approximately 46.1 thousand operations in year 2000, 54.6 thousand in 2005, 63.2 thousand in 2010, and 71.7 thousand in 2015.

Annual Instrument Approaches

Identifying future requirements of navigational aid facilities is aided by forecasting the annual instrument approaches projected to occur in an airport. The 1994 Master Plan forecasted the annual instrument approaches for LHC Municipal Airport based on weather data and assumptions on traffic categories. Instead, the new forecast for the Limited Master Plan Update will use the estimate of 1% of the arrivals as instrument approaches provided by Airport staff and the assumption that half of the operations are arrivals. As previously noted, Airport staff indicate the actual number of operations were lower than logged in the 1998 TAF System for 1995, which would result in slightly lower number of instrument approaches than depicted.

Figure 2-5 illustrates the estimated 1992 and 1995 instrument approaches and new forecast compared with the 1994 Master Plan forecast. The estimate provided by LHC Municipal Airport practically doubles the number of instrument approaches of the 1994 Master Plan forecast. Considering the increasing sophistication of aircraft and GPS in the near horizon, it is a reasonable estimate.

Figure 2-5
Forecast Annual Instrument Approaches



Source: Airport Staff, LHC Municipal Airport
1998 FAA Terminal Area Forecast System

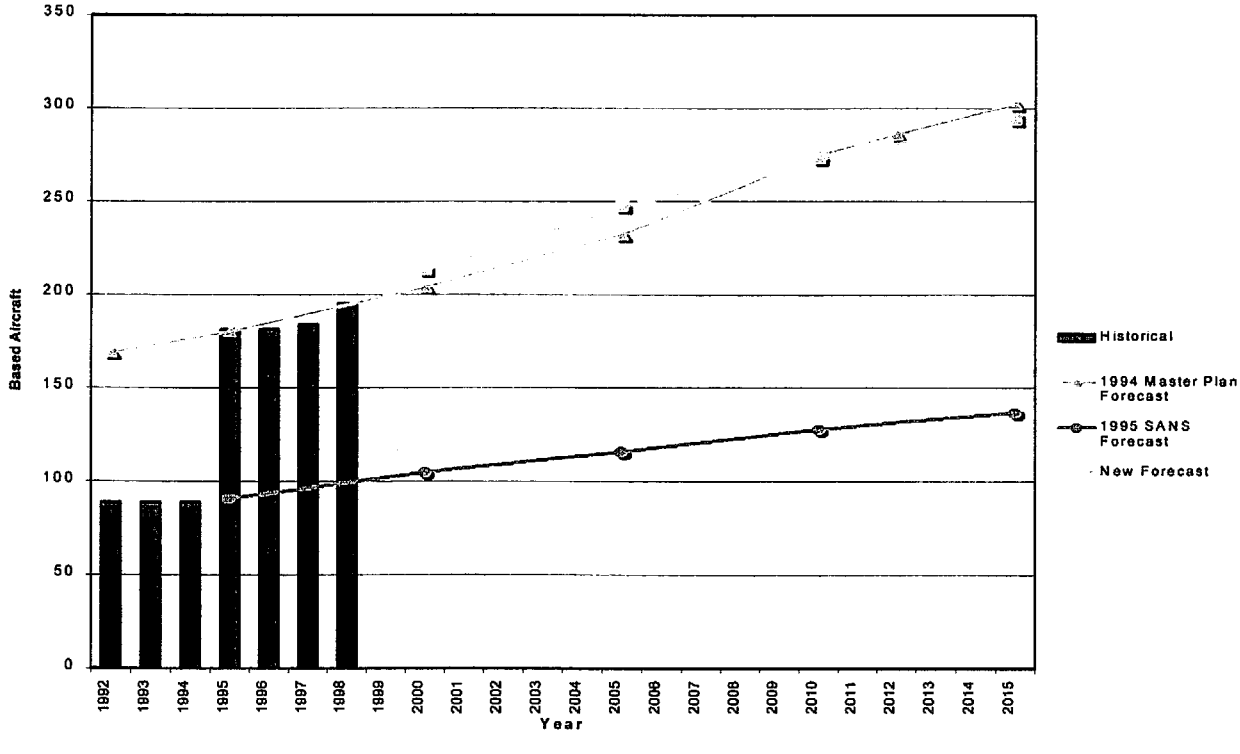
2.3.3 Based Aircraft

Based aircraft are instrumental in identifying an airport's capacity and future needs for hangar and tiedown spaces. The fleet mix of based aircraft further assist with defining the size and type of facility needed.

Based Aircraft

As indicated in Figure 2-6 and Table 2-4, the number of historical based aircraft at LHC Municipal Airport remained constant until 1995 when the number more than doubled to 181 aircraft according to the 1998 FAA TAF System. However, according to Airport staff the actual number of based aircraft prior to 1995 was more in line with subsequent years as indicated by the 1994 Master Plan. After 1995, the number of historical based aircraft maintained a low growth rate averaging 3% between 1996 and 1998. The 1994 Master Plan forecast accounted for a higher number of based aircraft in 1992, but it did project a similar low growth rate.

Figure 2-6
Forecast Based Aircraft



Source: Arizona 1995 State Aviation Needs Study
1998 FAA Terminal Area Forecast System

Table 2-4
Forecast Based Aircraft

Year	Based Aircraft	1994 Master Plan Forecast	AZ 1995 SANS Forecast	New Forecast
1992	89	169		
1993	89	173		
1994	89	176		
1995	181	180	91	
1996	181	185	94	
1997	184	190	97	
1998	195	194	99	
2000		204	105	213
2005		232	116	247
2010		275	128	273
2015		302	137	294

Notes: Forecasts between target years were extrapolated for for comparison purposes.

Source: Arizona 1995 State Aviation Needs Study
1998 FAA Terminal Area Forecast System

The Arizona 1995 SANS forecast of based aircraft also projected a similar growth rate. It ranged from an annual average of 3% in the year 2000 to 1.4% in 2015, and gradually declining in between. However, it does not account for the increase of based aircraft in 1995.

Consequently, the new forecast projects a slightly higher growth rate than the Arizona 1995 SANS forecast. The new forecast has 213 based aircraft in the year 2000, 247 in 2005, 273 in 2010, and 294 in 2015 within approximately 3% of the 1994 Master Plan forecast.

Based Aircraft Fleet Mix

The Limited Master Plan Update assumes 80% of the based aircraft are single-engine type aircraft. The assumption is based on review of the Arizona 1995 SANS based aircraft mix forecast, 1994 Master Plan aircraft mix forecast, and the 1998 based aircraft mix provided by LHC Municipal Airport. Between 1995 and 2015, the Arizona 1995 SANS projected a based aircraft mix ranging from 78% to 79% of single-engine aircraft. The range is between 84% and 86% for the 1994 Master Plan forecast. The Airport's account of based aircraft for 1998 calculates that 80% of the aircraft are single-engine.

2.4 SUMMARY

The comparative analysis of the 1994 Master Plan forecasts with historical data of recent years indicate that the previous forecasts projected reasonable growth rates with the difference being only a few percentage points from the adjusted projections. The disparity between the previous

and new projections is based on activity levels, which the 1994 Master Plan indicated to be higher. The higher levels are attributed to having accounted for a larger amount of activity for 1992 than recorded in the 1998 FAA TAF System. The exceptions were in the forecasts of enplanements and annual instrument approaches.

The 1994 Master Plan forecast projected enplanement growth rates to be approximately 13% for 1995 and continuing at an average 6% growth rate for the duration of the planning period. However, LHC Municipal Airport actually experienced a drop in enplanements in 1995 and a growth rate of less than one percent in 1996 and 1997 -- primarily attributed to the reduction in air service, not demand. Nevertheless, other studies, such as Arizona's 1995 SANS and Air Service Study, do support an increase of enplanements at LHC Municipal Airport. The new forecast accounts for the recent historical flat growth of enplanements and the positive indications by aviation and socioeconomic trends for increase growth.

The difference between the 1994 Master Plan forecast of annual instrument approaches and the new forecast is more due to methodology. The Limited Master Plan Update is basing the new forecast of instrument approaches on the airport staff estimate of 1% of arrivals, assuming half of the operations are arrivals.

The comparative analysis resulted in new forecasts of aviation activity, which represents an adjustment to activity levels. The new levels will be used to assess facility requirements and possible development alternatives.